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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,962	07/28/2003	Olli Piirainen	042933/373929	2270

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EXAMINER	
LEE, SIU M	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/627,962	PIIRAINEN ET AL.	
	Examiner	Art Unit	
	SIU M. LEE	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 January 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,8-12,15-20,25 and 26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,8-12,15-20,25 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 November 2007* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see page 2-5, filed on 1/6/2010, with respect to the rejection(s) of claim(s) 1-5, 8-12, 15-20, 25-26 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Barak et al. (US 2004/0076247 A1).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-5, 8-12, 15-20, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barak et al. (US 2004/0076247 A1, hereinafter Barak) in view of Abdallah et al. (US 6,308,562 B1).

(1) Regarding claim 1:

Barak discloses a method comprising:

generating a residual signal from a multicarrier signal, the residual signal representing a difference between the multicarrier signal and a hard-clipped multicarrier signal (figure 2 discloses a circuit 26 for reducing the PAR comprises an input signal

passes through a hard limiter 30 for clipping the input signal to generate a clipped signal and an adder for taking the difference between the input signal with the clipped signal to generate a difference signal 44, paragraph 0047-0048, paragraph 0043 discloses the input signal can be a multi-carrier signal such as OFDM);

applying a filtering function to the residual signal for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier (difference signal 44 is input to a filter 34 and generate a filtered difference signal with reduced bandwidth and with magnitude roughly equal to or slightly greater than the amount by which input signal 40 exceeds the threshold, paragraph 0049); and

combining the minimized residual signals and the multicarrier signal (second adder 36 subtracts filtered difference signal 46 from input signal 40, paragraph 0050).

Barak disclose filter 34 is preferably implement as a FIR filter but fails to explicitly disclose the filtering function comprises a least squares function.

However, Abdallah discloses coefficients used in a FIR filter is calculated by means of a recursive least squares (RLS) module 317, column 7, lines 24-26.

It is desirable to use a least square function in a FIR filter because it provides a fast convergence time. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Abdallah in the method of Barak to reduce the convergence time of a FIR filter.

(2) Regarding claims 2 and 9:

Barak further discloses prior to the combining the minimized residual signals, filtering the at least one minimized residual signal (filter 34 in figure 2, paragraph 0049).

(3) Regarding claims 3 and 10:

Barak further discloses delaying the multicarrier signal, wherein the delayed multicarrier signal is combined with the minimized residual signal (a delay line 38 delays the input signal sufficiently so that it is in phase with the filtered difference signal at adder 36, paragraph 0050).

(4) Regarding claims 4 and 11:

Barak further discloses wherein the generating the residual signal includes clipping the multicarrier signal to a predetermined level to thereby generate the hard-clipped multicarrier signal (a hard limiter 30 clips the input signal received by circuit 26 at a predetermined threshold, paragraph 0047).

(5) Regarding claims 5 and 12:

Barak further discloses wherein the filtering comprises complex filtering (complex FIR filter may be used, paragraph 0053).

(6) Regarding claim 8:

Barak discloses an apparatus comprising:

a generator configured to generate a residual signal from a multicarrier signal, the residual signal representing a difference between the multicarrier signal and a hard-clipped multicarrier signal (figure 2 discloses a circuit 26 for reducing the PAR comprises an input signal passes through a hard limiter 30 for clipping the input signal to generate a clipped signal and an adder for taking the difference between the input signal with the clipped signal to generate a difference signal 44, paragraph 0047-0048, paragraph 0043 discloses the input signal can be a multi-carrier signal such as OFDM);

an applying unit configured to apply a filtering function to the residual signal for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier (difference signal 44 is input to a filter 34 and generate a filtered difference signal with reduced bandwidth and with magnitude roughly equal to or slightly greater than the amount by which input signal 40 exceeds the threshold, paragraph 0049); and

a combining unit configured to combine the minimized residual signals and the multicarrier signal (second adder 36 subtracts filtered difference signal 46 from input signal 40, paragraph 0050).

Barak discloses a FIR filter for filtering the filtered difference signal but fails to disclose the FIR filter apply a least squares function to the residual signal for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier.

However, Abdallah discloses coefficients used in a FIR filter is calculated by means of a recursive least squares (RLS) module 317, column 7, lines 24-26.

It is desirable to use a least square function in a FIR filter because it provides a fast convergence time. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Abdallah in the method of Barak to reduce the convergence time of a FIR filter.

(7) Regarding claim 15:

Barak discloses a system comprising:

a transmitter apparatus configured to reduce a peak-to-mean ratio of a multi-carrier signal (base station 20 comprising a PAR reduction circuit 26, paragraph 0044);

a generating unit configured to generate a residual signal from a multicarrier signal, the residual signal representing a difference between the multicarrier signal and a hard-clipped multicarrier signal (figure 2 discloses a circuit 26 for reducing the PAR comprises an input signal passes through a hard limiter 30 for clipping the input signal to generate a clipped signal and an adder for taking the difference between the input signal with the clipped signal to generate a difference signal 44, paragraph 0047-0048, paragraph 0043 discloses the input signal can be a multi-carrier signal such as OFDM);

an applying unit configured to apply a filtering function to the residual signal for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier (difference signal 44 is input to a filter 34 and generate a filtered difference signal with reduced bandwidth and with magnitude roughly equal to or slightly greater than the amount by which input signal 40 exceeds the threshold, paragraph 0049); and

a combining unit configured to combine the minimized residual signals and the multicarrier signal (second adder 36 subtracts filtered difference signal 46 from input signal 40, paragraph 0050).

Barak discloses a FIR filter for filtering the filtered difference signal but fails to disclose the FIR filter configured to apply a least squares function to the residual signal for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier.

However, Abdallah discloses coefficients used in a FIR filter is calculated by means of a recursive least squares (RLS) module 317, column 7, lines 24-26.

It is desirable to use a least square function in a FIR filter because it provides a fast convergence time. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Abdallah in the method of Barak to reduce the convergence time of a FIR filter.

(8) Regarding claims 16 and 19:

Barak further discloses the apparatus are implemented in WCDMA system (paragraph 0043) but fails to disclose the system is implemented in a EDGE mobile communication system.

However, it is obvious to one of ordinary skill in the art at the time of invention would recognize that the circuit for reducing the power to average ratio of (circuit 26) is not limit to be implemented in WCDMA system because the circuit only operate on a transmit signal (paragraph 0056) and would work equally well in other system such as a EDGE mobile communication system.

(9) Regarding claim 17:

Barak discloses an apparatus comprising:

generating means for generating a residual signal from a multicarrier signal, the residual signal representing a difference between the multicarrier signal and a hard-clipped multicarrier signal (figure 2 discloses a circuit 26 for reducing the PAR comprises an input signal passes through a hard limiter 30 for clipping the input signal to generate a clipped signal and an adder for taking the difference between the input

signal with the clipped signal to generate a difference signal 44, paragraph 0047-0048, paragraph 0043 discloses the input signal can be a multi-carrier signal such as OFDM);

applying means for applying a filtering function to the residual signal for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier (difference signal 44 is input to a filter 34 and generate a filtered difference signal with reduced bandwidth and with magnitude roughly equal to or slightly greater than the amount by which input signal 40 exceeds the threshold, paragraph 0049); and

combining means for combining the minimized residual signals and the multicarrier signal (second adder 36 subtracts filtered difference signal 46 from input signal 40, paragraph 0050).

Barak disclose using a FIR filter for filtering the difference signal but fails to discloses the FIR filter apply a least squares function to the residual signal for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier.

However, Abdallah discloses coefficients used in a FIR filter is calculated by means of a recursive least squares (RLS) module 317, column 7, lines 24-26.

It is desirable to use a least square function in a FIR filter because it provides a fast convergence time. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Abdallah in the method of Barak to reduce the convergence time of a FIR filter.

(10) Regarding claim 18:

Barak discloses a system comprising:

transmitting means for reducing a peak-to-mean ratio of a multicarrier signal (base station 20 comprising a PAR reduction circuit 26, paragraph 0044);

generating means for generating a residual signal from the multicarrier signal, the residual signal representing a difference between the multicarrier signal and a hard-clipped multicarrier signal (difference signal 44 is input to a filter 34 and generate a filtered difference signal with reduced bandwidth and with magnitude roughly equal to or slightly greater than the amount by which input signal 40 exceeds the threshold, paragraph 0049);

applying means for applying a filtering function to the residual signal for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier (difference signal 44 is input to a filter 34 and generate a filtered difference signal with reduced bandwidth and with magnitude roughly equal to or slightly greater than the amount by which input signal 40 exceeds the threshold, paragraph 0049); and

combining means for combining the minimized residual signals and the multicarrier signal (second adder 36 subtracts filtered difference signal 46 from input signal 40, paragraph 0050).

Barak disclose using a FIR filter for filtering the difference signal but fails to discloses the FIR filter apply a least squares function to the residual signal for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier.

However, Abdallah discloses coefficients used in a FIR filter is calculated by means of a recursive least squares (RLS) module 317, column 7, lines 24-26.

It is desirable to use a least square function in a FIR filter because it provides a fast convergence time. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Abdallah in the method of Barak to reduce the convergence time of a FIR filter.

(11) Regarding claim 20:

Barak discloses a filtering means for filtering each minimized residual signal prior to implementation of the combining (filtering 34 in figure 2).

(12) Regarding claim 25 and 26:

Barak further discloses wherein the filter comprises a filter (filter 34 in figure 2).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIU M. LEE whose telephone number is (571)270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Siu M Lee/
Examiner, Art Unit 2611
3/30/2010

/CHIEH M FAN/

Supervisory Patent Examiner, Art Unit 2611